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ment of Agriculture, has had the matter investigated and it appears that the young locusts, which are now all hatched, turn out to be one of the larger wide-spread species, viz., the differential locust (*Caloptenus differentialis*). This species has at times been very abundant in Illinois and in other States but, according to its past history, there is no danger of its ever becoming so serious a pest as the Rocky Mountain locust, and hence Professor Riley believes there is no occasion for alarm.

ENTOMOLOGICAL NEWS.—At a recent meeting of the London Entomological Society, the venerable Professor Westwood remarked that an insect (*Machærota ensifera* Burm.) in Ceylon, allied to the frog-hopper (Aphrophora), instead of being enclosed in a liquid (cuckoo-spittle), formed a case by the rapid hardening of the liquid secreted.——Dr. Geo. Marx, artist of the Agricultural Department, publishes in *Entomologia Americana* for May, a description of the male of *Gasteracantha rufospinosa* from Florida, with excellent figures of the two sexes. Although 170 species of this genius are known, the males of only two species have been hitherto discovered. The male differs much in shape, besides being less than one-quarter as large as the female.——In Bulletin No. 5 of the Cal. Acad. Sciences, T. L. Casey revises the California species of Lithocharis and allied genera of Staphylinidæ.——The Transactions of the American Entomological Society, XII, Nos. 3, 4, complete an excellent volume. They contain a thorough monograph of North American Chrysididæ, by S. Frank Aaron, illustrated by five plates; a monograph of the earlier stages of the Odonata, subfamilies Gomphina and Cordulegastrina, by Dr. H. A. Hagen; and a useful bibliographical and synonymical catalogue of the North American Cynipidæ, by Mr. W. H. Ashmead, with description of new species. Appended is a list of species peculiar to designated trees and plants, the greater number, as is well known, living on the oaks.

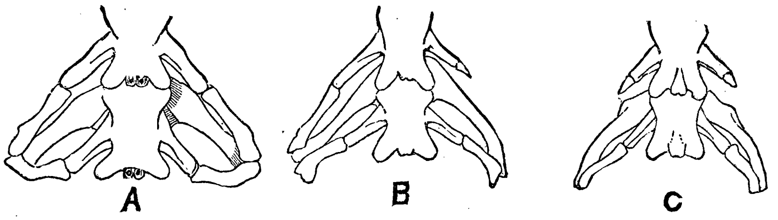
ZOOLOGY.

SELF-DIVISION IN SEPTIC MONADS.—In Dr. Dallinger's annual address before the Royal Microscopical Society, Feb. 10, he detailed the results, which are published in full in the journal of the society for April. Four forms were selected for study. In each of the four organisms the facts were discoverable in the development of the nucleus, the origin of the flagella and the growth of the body. They were best seen in *Tetramitus rostratus* and *Polytoma uvella;* not quite so well in *Dallingeria drysdali*, and least perfectly in *Heteromita rostrata;* but in all they were seen with sufficient clearness to leave no doubt. Each of these septic organisms terminates a long series of fissions with what is practically a generative act of fusion. The last two of a long chain of self-divided forms fuse into one, become quite still, and at length the investing sac bursts and a countless host of germs is poured forth. The growth of these germs into forms like the parent was continuously watched, showing gradual enlargement and ultimate, but as to time somewhat uncertain, appearance of the nucleus, and the somewhat sudden appearance of the flagella or thread-like motor organs, the latter being found in each instance to arise in the nucleus. Very soon after the adult stage is reached the act of self-division commences, and is kept up for hours in succession. The delicate plexus-like structure becomes aggregated at one end of the nucleus, leaving the rest perfectly clear, except that a faint beading is seen in the middle line, with two or three fine threads from it to the plexus. Then occurs the commencement of partition of the nucleus, followed by a slight indication of division of the body-substance. Quickly afterwards the nucleus becomes completely cleft, and the body-substance follows suit. Then the plexus-like condition is again diffused equally over the whole nucleus. When the generative condition is approached by the last generation of a long series of dividing forms, it is remarkable that the organism becomes amœboid, showing how far-reaching is the amœboid state. In this condition, when two such forms touch one another, they coalesce and fuse into each other almost as though two globules of mercury had touched, until nucleus reaches nucleus and two melt into one, and the blended bodies become a globular sac, which ultimately emits an enormous number of germs. Previous to the blending it is now made out that all traces of plexus-like structure are lost in the nucleus, which becomes greatly enlarged and assumes a milky aspect, and shows no trace of structure throughout the process of fusion. Afterwards it begins to diffuse itself radially through the body-sarcode until every trace of the nucleus is gone, and the still globule of living matter becomes tight and glossy, but no trace of structure can be anywhere found in it. In this condition it remains for six hours, when it emits the multitude of germs. After giving similar details about several other organisms, Dr. Dallinger summed up thus: "One thing appears clear, the nucleus is the center of all the higher activities in these organisms. The germ itself appears to be but an undeveloped nucleus, and when that nucleus has attained its full dimensions there is a pause in growth, in order that its internal development may be accomplished. It becomes practically indisputable that the body-sarcode is, so to speak, a secretion, a vital product of the nucleus. From it the flagella originally arise; by it the act of fission is initiated and in all probability carried to the end; the same is the case with fertilization and the production of germs. We are thus brought into close relation with the behavior of the nucleus in the simplest condition. No doubt far profounder and subtler changes are concurrently proceeding. We, of course, are no nearer to the solution of what life is. But to come any distance nearer to a knowledge of how the most living part of the minutest organisms acts in detail has for me, and for most biologists, an increasing fascination."

Blue Color of Animals.—Professor F. Leydig says that a blue granular pigment is rarely found in animals; in the crayfish, for example, there are blue crystals. The blue color is more often due to interference, owing to the presence of lamellæ, or to the fibrils of connective tissue, as in the tapetum fibrosum of the eye of ruminants; the corium of the living larva of *Pelobates fuscus* is similarly blue. A dull material overlying black pigment produces blue, as in the case of blue eyes, which are due to the urea shining through the non-pigmented iris, and in some frogs. Dark chromatophores have a like effect, as has too the swelling of the corium consequent on the filling of the lymph-spaces. In conclusion, the author discusses the tegumentary secretions, which are of various colors, and which can be washed away; an example is to be seen in the celestial blue color of the abdomen of *Libellula depressa* and, perhaps, the "bloom" of the pupa of the Apollo butterfly. On the other hand, the coloring matter may be in cells of the epidermis, as is the case with the rosy color of *Tetrao urogallus*, and can then, of course, only be removed after the destruction of the tissue which contains it.—*Journ. Roy. Micr. Soc., April, 1886.*

Perception of Brightness and Color by Marine Animals.—Professor V. Graber has made some further experiments on marine animals with the divided box already used by him. He finds that the common star-fish is an eminently leucophilous or light-loving animal, for the bright division of the box always contained 2.2 as many individuals as the dark; they avoid red, or are erythophobes, three times as many seeking a dark-blue compartment. The common jelly-fish (*Medusa aurita*) was neither specially sensitive to brightness nor to color; but it is possible that the results might be different with larger aquaria. *Idotea tricuspidata* is very sensitive to light at the maximum differences in brightness, for 6.3 as many individuals sought the white as the dark compartment; but they are quite insensitive to less marked differences. They object to red and like blue. *Gammarus locusta* does not seem to be affected by light or shade. *Rissoa octona* dislikes the dark and is sensitive to less marked distinctions; it again, in the proportion of 103 to 2, liked blue and avoided red. *Gasterosteus spinachia*, like fresh-water fishes, prefers darkness in the proportion of 78 to 6, and *Syngnathus acus* gave somewhat similar results.—*Journ. Roy. Micr. Soc., April, 1886.*

The Sacrum of Menopoma.—In a recent paper read before the Biological Society of Washington, Mr. F. A. Lucas drew attention to the fact that the figure of the pelvis of Menopoma in the article Amphibia, ninth edition of the Encyclopædia Britannica, must have been drawn from an abnormal specimen. The figure and accompanying text credit Menopoma with two sacral vertebræ, but an examination of ten specimens failed to show the occurrence of more than one. An abnormal specimen in the possession of Professor H. A. Ward showed an intermediate condition between the figure in the Enc. Brit. and the normal sacrum, having the right ilium attached to one vertebra, and the left to two vertebræ. Mr. Lucas further called attention to the variation in the number of dorsal vertebræ in certain Urodeles. Menopoma may have 19 or 20 pre-sacrals; Necturus, 18 or 19. Siren may have 41, 42 or 43 pre-caudals; Muraenopsis, 64 or 65. The total number of vertebræ in two perfect skeletons of Siren was 101 and 108; in three perfect Muraenopsis, 105, 107, 111.



A, specimen with two sacral vertebræ, fig. 2, article Amphibia, Encyclopædia Britannica, 9th ed.; *B*, specimen normal on right side, two sacrals on left—drawn by H. L. Ward from a skeleton in the possession of H. A. Ward; *C*, normal specimen.

ZOOLOGICAL NEWS.—*Vermes.*—M. J. Perrier announces as the result of his studies of the Trematoda (Archives de Zool. Experimentale, 1885) that the muscles divide at their extremities, the divisions being inserted upon projections of the inner side of the cuticle. The suckers have a more developed muscular system than has hitherto been admitted; since they are completely enveloped by one or two elastic membranes upon which the muscular bundles of the organ are fixed and are also subject to the action of exterior muscles. There is often a mass of glandular cells in the external layer of the parenchyma. The digestive tract is always covered internally by a layer of elongated cellules united only at their base. The canal of Laurer is not a vagina, but a canal of safety, permitting of the discharge of any too abundant genital products. From the disposition of the external orifices external self-fecundation is the only mode of fecundation possible. The spongy cords found in all Platyelminths are certainly nerve fibers, and the large multipolar cells are nerve cells.——Dr. von Linstow describes (Arch. f. Natur., 1885, part III) several new Nematodes and Trematodes.

Echinoderms.—M. Ed. Perrier contributes to the Annales des Sciences Naturelles an account of the echinoderms collected by the *Travailleur* and *Talisman.* These include several Brisingidæ and Stichasteridæ; species of Cribrella and Solaster; several Pterasteridæ, a family almost entirely confined to great depths; many Goniasteridæ, and some Archasteridæ and Porcellanasteridæ. Asteriadæ and Asterinidæ are almost wanting, Linckiadæ entirely so. Sixty-four species is the total, of which fifty are new.

Mollusks.—The Archiv. für Naturgeschichte for 1885 (part III) contains remarks upon the post-embryonal development of the Naiadæ, by Fred. Schmidt.——In a second article upon the molluscan fauna of Behring's sea (Arch. f. Naturgeschichte, 1885, part III) A. Krause enumerates sixty-six Gastropoda, including several new species and three Pteropods, one of which is new.

Mammals.—Dr. E. L. Trouessart (Ann. d. Sci. Naturelles) supports his previously-expressed views that the musk-rat of the Antilles should be placed in the genus Hesperomys, but made the type of the sub-genus Megalomys. The form of its teeth will not permit it to be ranged under the sub-genus Holochilus, which is by Mr. Thomas considered to be a genus. *Megalomys pilorides* has as yet been found only in Martinique and St. Lucia. It reaches the size of a rabbit, and did great damage to the plantations. Systematic war waged upon it by the colonists has almost, if not quite, brought about its extinction, so that the examples in the Paris Museum are perhaps all that is left of this curious and interesting species. [The name Megalomys is preoccupied.–*Ed.*]

EMBRYOLOGY.[1]

1. THE DEVELOPMENT OF PATELLA.—Dr. William Patten,[2] of Boston, while working in Claus's laboratory at Trieste, succeeded in artificially fertilizing the ova of a species of Patella, the specific name of which is not given. The ova measured 0.12^{mm} in diameter; bluish-green in color and opaque. Acetic acid and glycerine were used to render them transparent enough for a study of the general external characters. The internal changes were studied by means of sections. The eggs were matured from the first of November to the middle of January.

The ova were covered by a very thick transparent chorion, traversed by fine pore canals. The micropyle was a wide crater-like opening in the chorion at one pole of the egg; within this opening were a number of highly refractive globules which greatly interfered with the observation of the fecundation and formation of the polar globules. Ten minutes after removing the ova from the ovaries, the pole globules appear as two colorless and transparent prolongations arising from the surface of the ovum at the bottom of the crater-like micropyle. The polar cells are of great

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[1] Edited by JOHN A. RYDER, Smithsonian Institution, Washington, D. C.

[2] The Embryology of Patella. Arbeiten aus dem Zool. Inst. zu Wien. Tom. VI, Hft. 2, pp. 149–174, pls. I to V, 1885.